AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A method for measuring a halogen concentration comprising introducing a gas containing a halogen gas into a metal iodide-containing solution to liberate iodine, ~~and~~ determining quantitatively the liberated iodine by measuring a visible light transmittance of the solution at a specific wavelength, and calculating the halogen concentration in the gas from the quantity of iodine liberated.

2. (original): The method for measuring a halogen concentration according to claim 1, wherein the metal iodide-containing solution contains starch.

3. (original): The method for measuring a halogen concentration according to claim 1, wherein the specific wavelength ranges from 460 nm to 520 nm.

4. (original): The method for measuring a halogen concentration according to claim 2, wherein the specific wavelength ranges from 580 nm to 780 nm.

5. (original): The method for measuring a halogen concentration according to claim 3 or 4, wherein the visible light is a laser beam.

6. (original): The method for measuring a halogen concentration according to claim 1 or 2, wherein the halogen gas is chlorine gas or fluorine gas.

7. (currently amended): A method for continuously measuring a halogen concentration, comprising introducing continuously a gas containing a halogen gas into a continuously flowing metal iodide-containing solution to liberate iodine, ~~and~~ determining quantitatively the liberated iodine by measuring a visible light transmittance of the solution at a specific wavelength, and calculating the halogen concentration in the gas from the quantity of iodine liberated.

8. (original): The method for continuously measuring a halogen concentration according to claim 7, wherein the metal iodide-containing solution contains starch.

9. (original): The method for continuously measuring a halogen concentration according to claim 7, wherein the specific wavelength ranges from 460 nm to 520 nm.

10. (original): The method for continuously measuring a halogen concentration according to claim 8, wherein the specific wavelength ranges from 580 nm to 780 nm.

11. (original): The method for continuously measuring a halogen concentration according to claim 9 or 10, wherein the visible light is a laser beam.

12. (original): The method for continuously measuring a halogen concentration according to claim 7 or 8, wherein the halogen gas is chlorine gas or fluorine gas.

13. (withdrawn): A method for measuring a hydrofluorocarbon concentration, comprising measuring a concentration of at least one kind of hydrofluorocarbon in a gas mixture by infrared spectrometry.

14. (withdrawn): The method for measuring a hydrofluorocarbon concentration according to claim 13, wherein the hydrofluorocarbon concentration is not higher than 8 mole%.

15. (withdrawn): The method for measuring a hydrofluorocarbon concentration according to claim 13 or 14, wherein the gas mixture contains a perfluorocarbon, and hydrogen fluoride and/or fluorine, and the concentration of the perfluorocarbon and/or the hydrogen fluoride are measured simultaneously by infrared spectroscopy.

16. (withdrawn): The method for measuring a hydrofluorocarbon concentration according to claim 15, wherein the gas mixture is rich in the perfluorocarbon and/or the hydrogen fluoride.

17. (withdrawn): The method for measuring a hydrofluorocarbon concentration according to claim 13, wherein the condensation of a gas on a surface of a measurement cell is

prevented by heating the measurement cell.

18. (withdrawn): The method for measuring a hydrofluorocarbon concentration according to claim 17, wherein hydrogen fluoride gas is removed after the gas concentration measurement by introducing a purge gas into the heated measurement cell.

19. (withdrawn): The method for measuring a hydrofluorocarbon concentration according to claim 13, wherein the hydrofluorocarbon is represented by General Formula (1):

$$C_xH_yF_z \qquad (1)$$

where x, y, and z are respectively an integer satisfying the relations:

$$1 \leqq x \leqq 3,\ 1 \leqq y \leqq 4,\ 1 \leqq z \leqq 7,\ \text{and } 2x+2 = y+z.$$

20. (withdrawn): The method for measuring a hydrofluorocarbon concentration according to claim 13, wherein the hydrofluorocarbon is trifluoromethane, 1,1,12-terafluoroethane and/or pentafluorethane, and the concentration thereof is measured respectively at a wavenumber ranging from 2900 cm^{-1} to 3100 cm^{-1} as the measurement wavenumber.

21. (withdrawn): The method for measuring a hydrofluorocarbon concentration according to claim 15, wherein the perfluorocarbon is tetrafluoromethane and/or hexafluoroethane, and the concentration thereof is measured respectively at a wavenumber ranging from 1000 cm^{-1} to 2700 cm^{-1} as the measurement wavenumber.

22. (withdrawn): The method for measuring for hydrofluorocarbon concentration according to claim 15, wherein the concentration of hydrogen fluoride in the gas mixture is measured at a wavenumber ranging from 3600 cm^{-1} to 4300 cm^{-1} as the measurement wavenumber.

23. (currently amended): A measurement apparatus for continuously measuring a halogen concentration for use in the continuous measurement of a halogen concentration according to claim 7, comprising

a reaction section in which a metal iodide-containing solution is reacted with a halogen-containing gas to liberate iodine ~~for liberating iodine~~;

a liquid feed pump connected to the reaction section for introducing ~~a~~ the metal iodide-containing solution into the reaction section;

an introduction tube for sampling a part of ~~a reaction gas containing~~ a halogen-containing gas ~~from~~ connecting a halogen compound production line to the reaction section;

a gas flow rate controller connected to the introduction tube ~~and serving to introduce~~ for continuously introducing the halogen-containing gas into the reaction section;

a gas-liquid separation section connected to the reaction section for separating an undissolved gas;

a measurement section connected to the gas-liquid separation section ~~equipped with~~ comprising a visible light source for emitting visible light for measurement of iodine liberated in

the reaction section, and a detector for measuring a transmittance of the visible light emitted from the visible light source~~;~~, and

a data processing section for calculating the halogen concentration based on the measured transmittance of visible light.

24. (currently amended): A measurement apparatus for continuously measuring a halogen concentration for use in the continuous measurement of a halogen concentration according to claim 8, comprising

a reaction section in which a solution containing metal iodide and starch is reacted with a halogen-containing gas to liberate iodine; ~~for liberating iodine;~~

a liquid feed pump connected to the reaction section for introducing ~~a~~ the solution containing metal iodide and starch into the reaction section;

an introduction tube for sampling a part of ~~a reaction gas containing~~ a halogen-containing gas ~~from~~ connecting a halogen compound production line to the reaction section;

a gas flow rate controller connected to the introduction tube ~~and serving to introduce~~ for continuously introducing the halogen-containing gas into the reaction section;

a gas-liquid separation section connected to the reaction section for separating an undissolved gas;

a measurement section connected to the gas-liquid separation section ~~equipped with~~ comprising a visible light source for emitting visible light for measurement of iodine liberated in the reaction section, and a detector for measuring a transmittance of the visible light emitted from the visible light source~~;~~, and

a data processing section for calculating the halogen concentration based on the measured transmittance of visible light.

25. (original): The measurement apparatus for continuously measuring a halogen concentration according to claim 23 or 24, wherein the visible light source is a laser device.

26. (original): The measurement apparatus for continuously measuring a halogen concentration according to claim 25, wherein the laser device is a semiconductor laser device.

27. (withdrawn): An apparatus for measuring a hydorfluorocarbon concentration for the method for measuring a hydrofluorocarbon concentration in a gas mixture according to claim 13, comprising a measurement cell equipped with a heating means; an introduction tube for sampling a part of a reaction gas from a perfluorocarbon production line; automatic switching valve connected with the introduction tube and a purge gas introduction of the reaction gas and a purge gas into the measurement cells; an infrared spectrometer; and a data processing device having a calibration curve installed therein.

28. (withdrawn): The apparatus for measuring a hydorfluorocarbon concentration according to claim 27, wherein the measurement cell has an optical window made from calcium fluoride for transmitting infrared ray.

29. (withdrawn): A process for producing a halogen compound by reaction of an organic compound with a halogen gas in a gas phase, wherein the halogen concentration is adjusted by the method for continuously measuring a halogen concentration as set forth in claim 7.

30. (withdrawn): The process for producing a halogen compound according to claim 29, wherein the halogen gas is chlorine gas or fluorine gas.

31. (withdrawn): The process for producing a halogen compound according to claim 29 or 30, wherein the organic compound is at least one hydrofluorocarbon represented by General Formula (2):

$$C_aH_bF_c \qquad (2)$$

where a, b, and c are respectively an integer satisfying the relations:

$1 \leq a \leq 3$, $1 \leq b \leq 4$, $1 \leq c \leq 7$; and $b+c=4$ for $a=1$, $b+c=6$ for $a=2$, and $b+c=8$ for $a=3$; and/or at least one fluoroolefin represented by General Formula (3):

$$C_dH_eF_f \qquad (3)$$

where d, e, and f are respectively an integer satisfying the relations: $2 \leq d \leq 3$, $0 \leq e \leq 5$, $1 \leq f \leq 6$; and $e+f = 4$ for $d=2$, and $e+f = 6$ for $d=3$.

32. (withdrawn): The process for producing a halogen compound according to claim 31, wherein the hydrofluorocarbon is at least one selected from the group consisting of

trifluoromethane, 1,1,1,2-tetrafluoroethane, pentafluoroethane, hexafluoropropane, and heptafluoropropane.

33. (withdrawn): The process for producing a halogen compound according to claim 31, wherein the fluoroolefin is at least one selected from the group consisting of tetrafluoroethylene, trifluoroethylene, and hexafluoroproprene.

34. (withdrawn): The process for producing a halogen compound according to claim 30, wherein the concentration of the fluorine gas is controlled to be not higher than the explosion range thereof.

35. (withdrawn): A process for producing a perfluorocarbon by reacting a hydrofluorocarbon with fluorine gas in a gas phase, wherein the concentration of the hydrofluorocarbon is controlled by the method for measuring a hydrofluorocarbon concentration as set forth in claim 13.

36. (withdrawn): The process for producing a perfluorocarbon according to claim 35, wherein the concentration of the hydrofluorocarbon is controlled to be not higher than 8 mole%.

37. (withdrawn): The process for producing a perfluorocarbon according to claim 35 or 36, wherein the hydrofluorocarbon is represented by General Formula (1):

$$C_xH_yF_z \qquad (1)$$

where x, y, and z are respectively an integer satisfying the relations:

$$1 \leq x \leq 3,\ 1 \leq y \leq 4,\ 1 \leq z \leq 7, \text{ and } 2x+2 = y+z.$$

38. (withdrawn): The process for producing a perfluorocarbon according to claim 37, wherein the hydrofluorocarbon is at least one selected from the group consisting of trifluoromethane, 1,1,1,2-tetrafluoroethane, and pentrafluoroethane.